



# **The Permedia<sup>®</sup> 3 Create! Graphics Accelerator User's Guide**

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**CAUTION:** Changes or modifications to the Permedia3 Create! graphics accelerator card not expressly approved by 3Dlabs, Inc. void the user's warranty.

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# **INTRODUCTION**

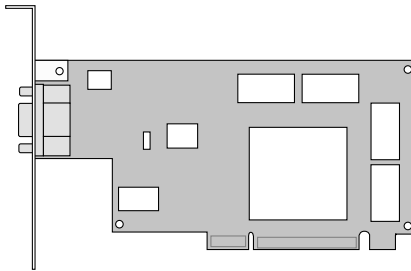
## **Welcome to 3Dlabs!**

Thank you for selecting a 3Dlabs<sup>®</sup> Permedia3 Create! graphics accelerator!

Whether you're running hard core 3D applications or your favorite games,

Permedia3<sup>®</sup> Create! has the power you need to work fast all day and play hard all night.

Built on fifteen years of quality from 3Dlabs, Permedia3 Create! integrates advanced silicon with quality drivers, delivering vibrant 32-bit color graphics at desktop resolutions up to 2048 x 1536. With Virtual Texturing for massive amounts of textures per scene and a Triple-blend texture core for realism, you have the professional graphics platform that doesn't forget how you like to spend your play time.



## **Overview**

Your Permedia3 Create! card has the following features:

- **The Permedia<sup>®</sup>3 graphics processor**  
The Permedia3 graphics processor accelerates advanced rendering operations, including single-cycle triple-blend multi-texturing and bump-mapping.
- **Pentium<sup>®</sup> III and 3DNow! optimization**  
Permedia3 Create! is fully optimized for Pentium III and 3DNow! to maximize 3D geometry and lighting performance.
- **Virtual Texturing**  
Virtual Texturing is a hardware-based, full demand-paged virtual texture storage sub-system. With it, your Permedia3 Create! card can cache up to 256MB of textures stored in main system memory.
- **32 MB memory**  
32 MB of SDRAM memory supports high-precision, high-performance acceleration.
- **High-precision, high resolution display**  
Permedia3 Create! has a 300 MHz RAMDAC enabling flicker-free resolutions up to 2048 x 1536.

- **16, 24, and 32-bit Z-buffer**

The Z-buffer provides the highest level of depth-precision, even at the highest resolutions.

- **Full AGP sideband addressing**

Sideband addressing ensures high-performance 3D acceleration through the advanced features of the AGP bus.

- **PowerDVD software**

PowerDVD from CyberLink is a high quality, DVD playback software solution, featuring 720 x 480 MPEG-2 video resolution and 5.1-channel AC-3 surround audio that rivals MPEG hardware performance.

- **Colorific<sup>®</sup> screen-to-print color matching**

Colorific from Sonnetech simplifies color matching without sacrificing accuracy.

## System Requirements

Your system needs the following features in order to support Permedia3 Create!:

- Intel-compatible, 166 MHz (minimum) system
- Windows<sup>®</sup> 95, 98, or NT 4.0 (or later) operating system
- 64 MB RAM (Random Access Memory)
- 16 MB minimum available hard drive space
- AGP expansion slot for AGP-based cards
- or
- PCI expansion slot for PCI-based cards
- **VGA multisync monitor**

# **CHAPTER 1 - INSTALLATION**



## Getting Ready

To successfully use your new Permedia3 Create! card, you must install the card and the accompanying driver software. Whether you install your new card or the driver first depends on whether a video card is already present in your system.

**If there is a video card in your system:** Install the driver first. Once the driver is loaded, remove the old card and install your Permedia3 Create! card. The driver installation instructions begin on page 6.

**If there is not a video card in your system:** Install your new card as described in the Installing Hardware section, below, then install the driver.

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**NOTE!** Be sure to register your new card using one of the options described on page 7.

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### ⇒ *Before You Start*

- Take every possible precaution against static electricity as you prepare to install the card: static can damage components. We have included an anti-static wrist strap for you to wear while installing the hardware: you should also try to work in a static free area (such as on a tile floor rather than carpet). You might even consider wearing special ESD, or at least rubber-soled, shoes.
- Save any work in progress and exit any open applications. Always back up your system before you install new hardware or software.
- Have your anti-static strap and a Philips-head screwdriver ready.

## **Installing Hardware**

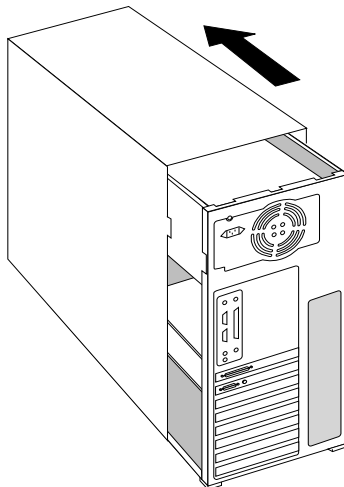
Permedia3 Create! cards are available in PCI and AGP versions. Check the documentation for your system for the location of PCI and AGP expansion slots in your system.

### *⇒ To remove an old card from your system*

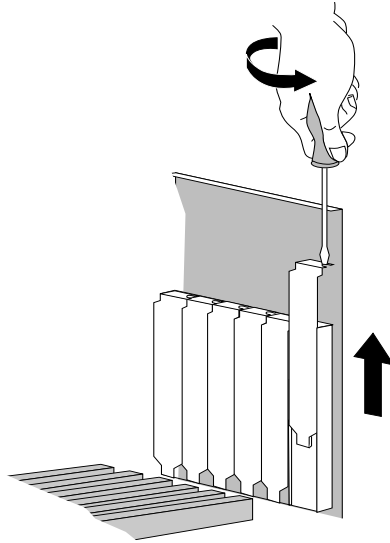
- 1.** Turn off and unplug the power source for your system and each of its peripherals.
- 2.** Unplug the monitor cable from the old card.
- 3.** Remove the cover from your system.
- 4.** Attach the anti-static strap to your wrist, and attach the other end to a bare, conductive (as opposed to painted or sticker-covered) area of your system's chassis.
- 5.** Remove any screws securing the card to the chassis.
- 6.** Lift the card out of the slot.

### *⇒ To install your Permedia3 Create! card*

- 1.** Turn off and unplug the power source for your system and each of its peripherals, if you have not already done so.
- 2.** Remove the cover from your system so you can access an appropriate expansion slot. See your system documentation for AGP and PCI slot locations.



3. Determine which slot you are going to use and remove its slot cover.

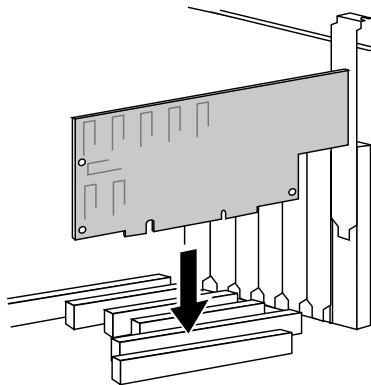


4. Attach the anti-static strap to your wrist, and attach the other end to a bare, conductive (as opposed to painted or sticker-covered) area of your system's chassis.
5. Remove the card from its anti-static packaging. **Write down the serial number for registration and future use.**
6. Place the card into the expansion slot and seat it firmly.

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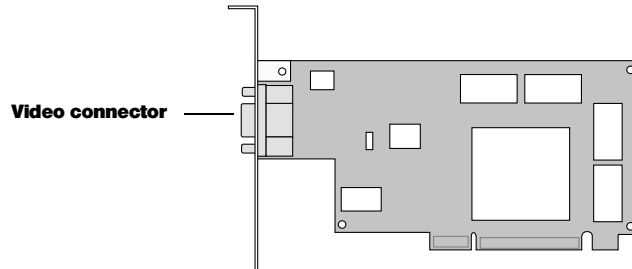
**IMPORTANT!** See your system documentation for instructions on securing the card to the chassis. Loose cards and connections can cause grounding and operating problems.

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## Installing Hardware

7. Remove the anti-static strap and replace the cover on your system.
8. Connect the video cable from your monitor to the video connector on the card.



9. Plug in and start up your system, including peripherals, and log on to your operating system.

## Installing Software

The Permedia3 Create! CD-ROM includes OpenGL and DirectX video driver software, which lets you set image quality and performance preferences for your card. It also includes the PowerDVD playback solution, and Colorific screen-to-print color matching software. Installing PowerDVD will enhance DVD playback resolution and audio, while Colorific ensures that what you see is what you print.

This section describes the three software installation processes for supported Windows systems.

### ⇒ *To install the Permedia3 Create! driver*

1. Start up Windows and log onto an account with administrator privileges.
2. Place the Permedia3 Create! CD-ROM in your CD-ROM drive. When the installation window opens, choose the driver installation.
3. Follow the instructions that appear on your screen. (Be sure to read the software license agreement.)
4. Restart your system at the prompt. You have installed your driver software successfully!

### ⇒ *To install Colorific*

1. Place the Permedia3 Create! CD-ROM in your CD-ROM drive. When the installation window opens, choose the Colorific installation.
2. Follow the instructions that appear on your screen.

### ⇒ *To install PowerDVD*

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**NOTE!** PowerDVD is compatible with the Windows 98 operating system exclusively.

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1. Place the Permedia3 Create! CD-ROM in your CD-ROM drive. When the installation window opens, choose the PowerDVD installation.
2. Follow the instructions that appear on your screen.

## **Registering Permedia3 Create!**

When you register your new card you:

- Activate your warranty
- Receive notification of software updates
- Qualify for technical support

You can complete the registration card and return it to us in the mail, or register on-line once your hardware and software installations are complete. (You must have Internet access to register on-line.)

### **⇒ *To register on-line***

- 1.** Open your Internet browser.
- 2.** Go to <http://www.3dlabs.com/register>
- 3.** Fill out the registration form that appears on your screen, and click Submit when you are finished. You have registered successfully!

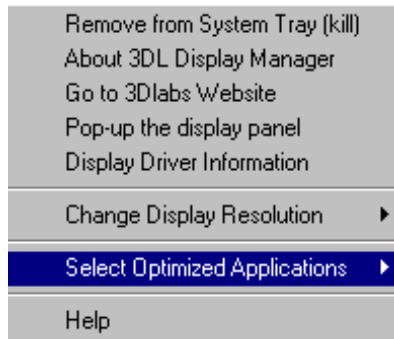
## **CHAPTER 2 - SOFTWARE CONFIGURATION**

## The Permedia3 Create! Driver

The Permedia3 Create! driver software lets you optimize the working relationship between your card, your system and your applications. Use the Task Bar-based Configuration Manager or the 3Dlabs Display Control Panel screens to customize the driver settings.

### The Task Bar - based Configuration Manager

When you install the Permedia3 Create! card and software, the 3Dlabs logo appears in your system tray, also called the task bar. Click the logo with your right mouse button to access the Display Configuration Manager and its shortcuts to these configuration tools:

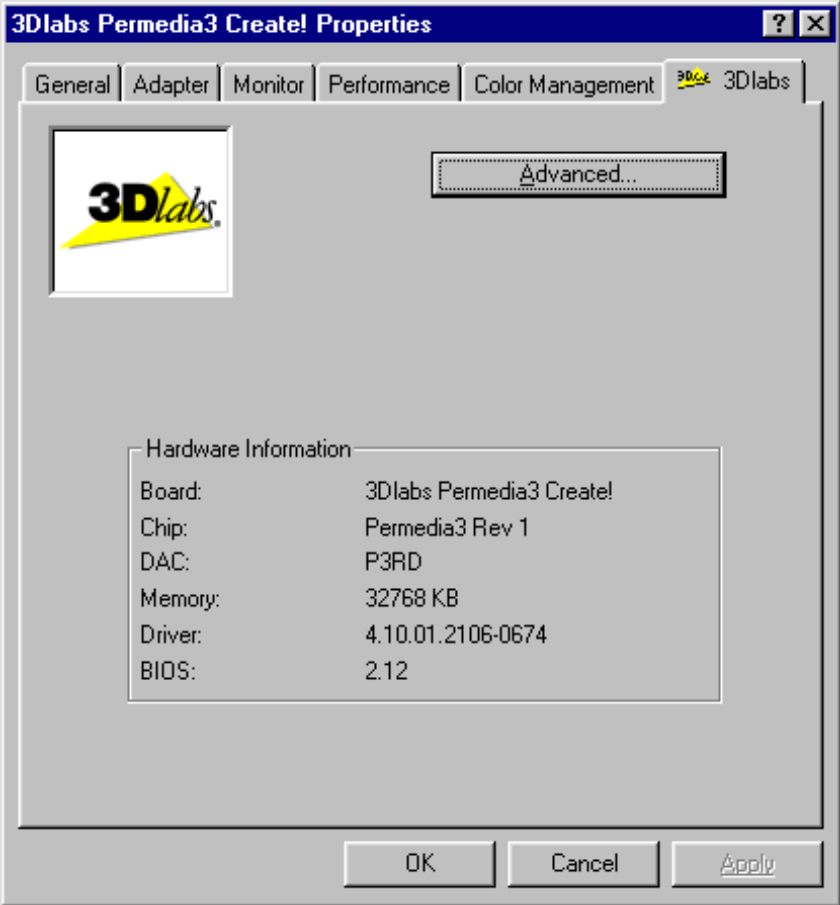


- *Remove from System Tray* lets you delete this task bar utility from your system. You will still be able to access the driver configuration options with the Display Control Panel.
- *About 3DL Display Manager* displays version information for this configuration utility.
- *Go to 3Dlabs Website* takes you directly to [www.3dlabs.com](http://www.3dlabs.com) through your existing Internet connection.
- *Pop up the Display Panel* reaches the 3Dlabs section on the display control panel.
- *Display Driver Information* provides quick access to information about your Permedia3 Create! card configuration.
- *Change Display Resolution* brings up a pop-up list of supported resolutions. Each resolution has an associated pop-up list of available refresh rates.
- *Select Optimized Application* quickly accesses a list of supported applications. Click an application in the list to optimize card settings for your selected option.
- *Help* provides standard Windows-style help on the driver and its settings.



### The Display Control Panel

When you click the 3Dlabs tab in the Display Control Panel, this introductory page appears:



It provides software version and basic hardware specifications, and a point-of-entry to the full set of Permedia3 Create! driver customization tools. Click the Advanced button for access to these panels:

- Information
- Setup
- DirectX Support
- OpenGL Support

The following sections describe each in detail.

## Information Screen

The Information screen provides in-depth information about your selected (or the default) settings, as well as the hardware, software, and DirectX configuration. This information can be especially useful if you should need to contact technical support about your Permedia3 Create! card.



## Setup Screen

The Setup screen lets you configure settings that are not specifically related to Open GL or DirectX.



- You can enable (check) or disable (uncheck) the *Task-bar based Configuration Manager* with a click. The default setting for the Configuration Manager is Enabled.
- The *Optimal Refresh Rate* field displays the preferred refresh rate for your monitor. If it is available, Permedia3 Create! will use it. If that refresh rate is not available, Permedia3 Create! will use the next available lower rate.
- The *Gamma Adjustment* slider on the Setup screen lets you simultaneously adjust RGB color curves and define the color output for your display. You can also enter a precise Gamma value, rather than use the slider, when you know which value is appropriate for your monitor and ambient lighting conditions.

## DirectX Support Screen

This screen controls DirectX application specific driver settings for Windows 95/98 users of Permedia3 Create!, and lets you create your own settings. When the panel first appears, the *Defaults*, *Add New* and *Remove Settings* buttons, as well as the *Advanced Options* section, are hidden. They appear when you click the *Advanced* button.

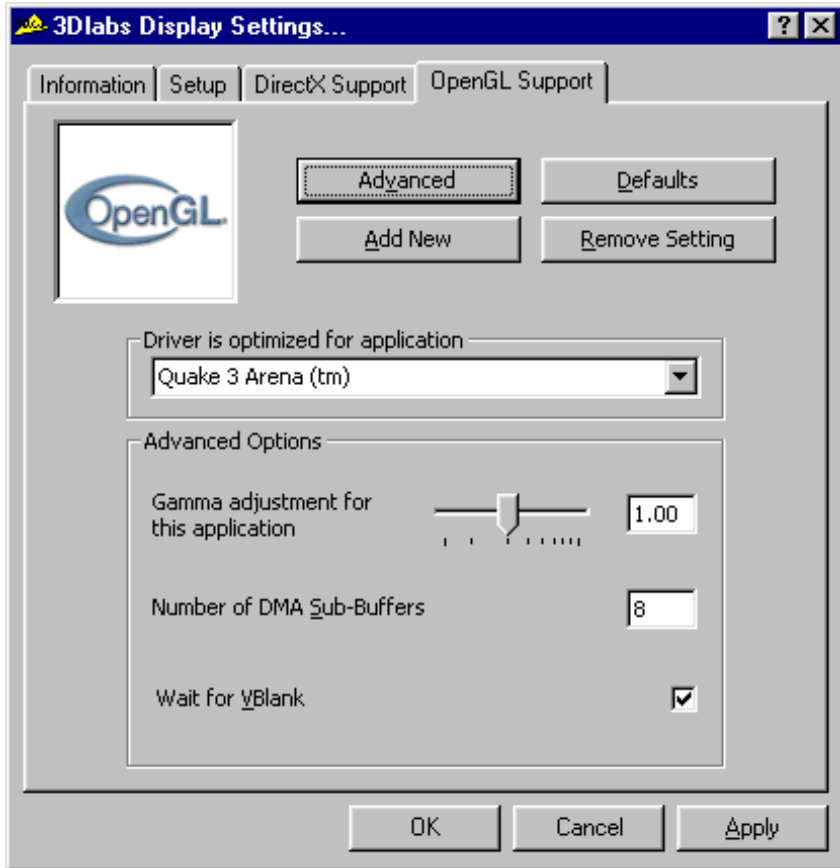


- Click *Driver is optimized for application* to reach a drop down list of DirectX applications, then select the application you want to use. The rest of your selections on this screen will apply to the specified application. You can also click *Select optimized application* in the Configuration Manager and select your application from that pop-up list.
- The *Add New* button lets you create a new setting, with a user specified name. *Remove Setting* will remove user created settings, but will not remove the default settings created at driver installation time. *Default* will restore the factory default settings.
- *Texture Origin at Top Left Corner* shifts textures slightly as they are applied to objects, and may result in better image quality with some applications.

- *Enable 8Bit RGB textures* enables Direct 3D support for 8bit textures that do not use a separate “look-up” table to specify color. These can be useful for applications which use the new features of DirectX 6, but older applications can misinterpret these new formats. If you have problems such as incorrect colors or poor quality texturing, try disabling this option.
- *Disable 16-bit alpha-luminance* textures enables Direct3D support for monochrome (luminance) textures. These can be useful for applications which use the new features of DirectX 6, but older applications can misinterpret these new formats. If you have problems such as incorrect colors or poor quality texturing, try disabling this option.
- *Enable Palettized textures* enables Direct3D support for 8bit textures which use a separate “look-up” table to specify the color. These are useful for graphics cards with a small amount of memory. However, they can be slower than the alternatives available on cards with large amounts of memory. For best performance this option should only be enabled for applications that will not operate correctly otherwise.
- *Disable D3D Gamma Controls* lets you turn off DirectX gamma control if you experience an extremely dark screen, potentially caused by an application’s use of an incorrect default.
- *Gamma adjustment for this application* affects the entire screen display. As with the contrast on your television, you can adjust this value if the selected application causes your display to consistently look too dark or too light.

## OpenGL Support Screen

This screen controls OpenGL application-specific driver settings and enables you to create your own settings. When the panel initially appears the *Defaults*, *Add New* and *Remove Settings* buttons, as well as the *Advanced Options* section, are hidden. They appear when you click the *Advanced* button at the top of the screen.



- Click *Driver is optimized for application* to reach a drop down list of applications, then select the one you want to use. The rest of your actions on this screen will apply to that choice. You can also click *Select optimized application* in the Configuration Manager and select your application from that pop-up list.
- Click *Add New* to add an application to the list and customize its settings. *Remove Setting* will remove a user created setting, but will not remove default settings created at driver installation time. *Default* will restore the factory default settings.
- *Gamma adjustment for this application* affects the entire screen display. As with the contrast on your television, you can adjust this value if the selected application causes your display to consistently look too dark or too light.

- *Number of DMA Sub-Buffers* lets you set the number of Direct Memory Access (DMA) sub-buffers allocated for use by OpenGL. (DMA is a technique whereby a device can directly access memory without having to go through the CPU). Each DMA buffer is sub-divided into sub buffers which are used in conjunction with a queued DMA mechanism to reduce latency in the system. The number of sub buffers can be set, with 8 as the default. Setting it to 2 will disable the queued DMA mechanism.
- *Wait for Vblank* lets you determine whether the OpenGL driver will attempt to synchronize screen updates to the vertical blanking interval. Smooth animation of 3D applications can be achieved by rendering (drawing) to an off-screen window/desktop sized color buffer and copying or swapping the contents to the displayable front buffer at the completion of each frame.

This option is enabled as the default so that there is no visible tearing. Disabling this option gives the highest rendering frame rates of double buffered applications. You should disable this option for instance when running benchmarks.

## **CHAPTER 3 - TROUBLESHOOTING**



## Troubleshooting

If you have trouble using your Permedia3 Create! card or a 3D application, you may find the answer to your problem in the following sections. Always start your problem-solving efforts with the simplest solution and work up to the more complex ones.

### Monitors and Display Resolutions

**QUESTION:** My monitor is either blank, or the displayed image is distorted, scrambled or smaller than I expected.

**SOLUTION:** If the monitor is blank, be sure that your system and monitor are plugged in and turned on. Is the monitor's power cord attached securely? Check each component's documentation for the location and use of power connectors and switches.

**SOLUTION:** Make sure that your video cable is connected securely to the monitor *and* to the monitor connector on your Permedia3 Create! card. See your monitor documentation and *Chapter 1 - Installation*, in this document.

**SOLUTION:** Your card might not be seated properly in the AGP slot. Remove and reinstall your card as described in *Chapter 1 - Installation*. Remember to use the anti-static wrist strap when opening your system and handling the card.

**QUESTION:** The performance of and/or the available resolutions for my Permedia3 Create! card are not what I expected.

**SOLUTION:** The driver may not have installed fully, or a file may have been corrupted. Try installing the driver again.

**SOLUTION:** You may have selected a display setting that is incompatible with accelerated 3D graphics applications. See *Appendix A - Specifications*, for a list of compatible resolutions.

**QUESTION:** When I restart my system, an "Invalid Display Settings" message appears on-screen, followed by "The default display resolution has been temporarily used by the system."

**SOLUTION:** Within a few seconds, the error messages should be replaced by a window that allows you to set a display resolution. Pick your preferred resolution from the list and you should get the sharp results you expected.

## **Systems and Networks**

**QUESTION:** Since installing the Permedia3 Create! card, my system either hangs or crashes to a blue screen when I try to start up, or the system starts up but VGA graphics don't display.

**SOLUTION:** Try to disable "VGA Palette Snoop." Follow these steps.

- 1.** Remove the Permedia3 Create! card and reinstall your old graphics card. See *Chapter 1 - Installation*, for instructions.
- 2.** Restart your system and enter Setup at the on-screen prompt. The key command to enter Setup can differ with each BIOS, so consult your system documentation if you do not see the command displayed as the system boots.
- 3.** Disable VGA Palette Snoop, again consulting your system documentation for its specific location in your BIOS.
- 4.** Choose Exit and Save Settings.
- 5.** Shut down, remove your old graphics card, and reinstall your Permedia3 Create! card.

**SOLUTION:** Make sure that you are not using an old graphics board driver, and that you have uninstalled any other graphics drivers — particularly those provided by other companies using 3Dlabs chipsets.

**SOLUTION:** Please see the System Integration Guide in the FAQ section at <http://www.3Dlabs.com>.

**SOLUTION:** You may need to update your BIOS. See your system documentation for BIOS upgrade information.

**QUESTION:** I'm experiencing network problems since I installed my Permedia3 Create! card.

**SOLUTION:** You may need to reinstall or update your Ethernet driver. See your system or Ethernet adapter documentation for more information.

## **Online Information**

If you cannot find the problem you are experiencing, or the solution to a problem, listed in this chapter, check the Frequently Asked Questions (FAQ) list at [www.3dlabs.com](http://www.3dlabs.com), or contact your Permedia3 Create! card vendor for additional help.

# **APPENDIX A - SPECIFICATIONS**

## **Permedia3 Create! Specifications**

| <b>Item</b>        | <b>Specification</b>                   |
|--------------------|--|
| Card size          | NLX shortcard, AGP or PCI, single-slot |
| Power requirement  | 10.25 W @ 3v3, 1.0 W @ 5V              |
| Graphics processor | Permedia3                              |
| RAMDAC frequency   | 300 MHz                                |
| Memory             | 32 MB SDRAM                            |

### **Monitor Resolutions**

Permedia3 Create! is capable of supporting monitor resolutions up to 2048 x 1536, in color depths of 8, 16 and 32 bits, with refresh rates from 60Hz to 200Hz – dependent on your system hardware, operating system and your monitor's capabilities.

## **APPENDIX B - GLOSSARY**

## **Terms and Definitions**

### **AGP**

Advanced Graphics Port. A dedicated graphics bus that transfers data at significantly higher speeds than the PCI bus.

### **Alpha Blending**

This means to create transparent objects by allowing for the blending of pixels to simulate the transparency characteristics of an object. With alpha information, an object can be designed from being totally transparent to opaque.

### **Alpha Buffer**

A portion of the frame buffer used to define the transparency value of a pixel in the frame buffer. This data can be used to blend the frame buffer pixel with the pixel to be drawn to create a composite pixel.

### **Anti-Aliasing**

A technique employed to remove any jagged edges from an object to appear smooth. This is accomplished by gradually modifying the hue and saturation of pixels.

### **API**

Application Programming Interface. The API translates the instructions from the application program into device commands that are specific to the screen's display controller, the graphics board.

### **Atmospheric Effects**

The effect derived from adding one or more layers around an object.

### **Bilinear Sampling**

The process whereby texture mapping is done through filtering.

### **Bit Depth**

Bit depth is another way of expressing the numbers of colors available. A color bit depth of 8 is equivalent to 256 colors, a bit depth of 16 (15 bit of color plus a 1 bit overlay) yields 32768 colors, and a bit depth of 32 (24 bit RGB plus 8 bit of overlays) equals 16.7 million colors. The latter is often referred to as true color.

### **Clipping**

Removal of elements or sections not contained within the active viewing area.

### **DAC**

Digital to Analog Converter.

### **Depth Cueing**

A technique used to give the illusion of depth. With depth cueing, the part of an object that is farther away is displayed with a lower intensity to give the effect of depth.

### **Digital Flat Panel Display**

A digital, flat-panel display dramatically improves the quality of images viewed on your screen.

**Dithering**

The process of converting an image with a certain bit depth to one with a lower bit depth. Dithering enables the application to convert an image's colors that it cannot display into two or more colors that closely resemble the original. Dithering works because the mind is tricked by the pattern of colors into thinking it's a different color.

**Double Buffering**

With double-buffering, images are rendered in the back buffer and then displayed on the screen once the drawing is completed. This results in the smooth, flicker-free rotation and animation of 3D models and scenes.

**Driver**

A driver is a special interface program that is developed to perform the communication between the application program, the device (i.e., graphics peripheral) and the operating system.

**EVGA**

Extended Video Graphics Array. EVGA runs at 1024 x 768.

**Flat Shading**

The simplest method of shading. Each triangle is assigned one single color, resulting in a faceted appearance of the surface.

**Floating Point**

The portion of the mathematics execution unit of a processor generally associated with multiply and divide operations.

**Frame Buffer**

A 24-bit, true-color frame buffer provides 8 bits for each red, green and blue primary display color. This results in 16.8 million color combinations. A second, or double, buffer enables system to calculate pixels one step ahead of the screen display for smooth, distortion free images.

**Gamma**

A curve representing both the contrast and brightness of an image. Changing the shape of the curve changes the RGB color output.

**Geometry**

The intermediate stage of the 3D pipeline, geometry determines the location of the object and the frame of reference of the viewer in relation to the object.

**Gouraud Shading**

This method of shading, more complex than flat shading, shows subtle color changes across an object. Gouraud Shading is accomplished by adding pixels in a graduated scale of colors.

**Graphics Accelerator Card**

A graphics accelerator performs 3D functions in the hardware, thereby relieving the CPU of repetitive, complex and intensive calls. This results in enhanced performance and speed.

**Heidi**

The API developed by Autodesk to work with its products, such as 3D Studio MAX and AutoCAD.

## **Terms and Definitions**

### **MIP-Mapping (for texture processing)**

A feature that delivers photo-realistic images by wrapping 2D bitmaps around 3D objects closely matching the texture to the object. MIP-Mapping allows different versions of a texture to be used for objects of different sizes. It also enables faster performance as textures do not need to be scaled in real time.

### **Multiple Resolution Support**

The ability to support multiple resolutions on the screen.

### **OpenGL**

The industry standard library of advanced 3D graphics functions developed by Silicon Graphics, Inc.

### **Perspective Correction**

A function that allows an object to maintain its 3D textural features as it moves away from the viewer, into the background.

### **Pipelining**

A basic hardware tool for accelerating processes.

### **Pixel**

The smallest addressable element of a cathode ray tube display. More simply put, the individual dots that make up the screen image.

### **Point Sampling**

The basic method of adding texture to an object. Point sampling does not include any filtering of textures.

### **RAMDAC**

The final component in the graphics subsystem that translates a digital image into an analog representation.

### **Rasterization**

A method to fill in colors for all pixels bound by vertices.

### **Rendering**

The final and most rigorous stage in the 3D pipeline where an object undergoes shading, texturing, etc.

### **RISC**

Reduced Instruction Set Computing.

### **SDRAM**

Synchronous DRAM is a cost-effective solution to improve bandwidth to and from memory, resulting in increased graphics performance.

### **SDTP**

Super Desktop Publishing. SDTP runs at 1600 x 1200.

### **Stencil Buffer**

Similar to stipple masking, the stencil buffer assists with the creation of transparent effects.



**Stipple masking**

A technique that spatially creates transparent effects by rendering an object through various patterns.

**Streaming SIMD**

An instruction set developed by Intel for Pentium III-processor based systems. Streaming SIMD can improve 3D vertice transformation and lighting, among other operations.

**SVGA**

Super Video Graphics Array. SVGA runs at 800 x 600.

**Tessellation**

The initial part of the 3D pipeline where the object is described by a set of triangles.

**Texture Mapping**

A technique that enables 2D graphic images to be “wrapped” around or “pasted” on to a 3D primitive. Perspective correction and lighting calculations allow for added realism.

**Transformation**

The change in rotation, size and perspective of an object in 3D space.

**Transparency**

A function that refers to the rendering of transparent (non-opaque) objects. Transparency is generally accomplished on a polygon rendering system using either screen-door transparency or alpha blending.

**Vectors/second**

Lines drawn per second.

**VGA**

Video Graphics Array. VGA runs at 640 x 480.

**VHR**

Very High Resolution. VHR runs at 1280 x 1024.

**VRAM**

Video Random Access Memory is an expensive, fast type of RAM that is used as display memory on high-end graphics boards.

**VRML**

Virtual Reality Modeling Language.

**Z-Buffer**

Z-Buffering is used to better define objects from the perspective of the third, or z, axis by allotting a depth coefficient to every pixel and sorting objects in real times or by using a dedicated z-buffer to hold objects not in view.

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EN 55024:1998, clause 4.2.2  
EN 55024:1998, clause 4.2.3.2  
EN 55024:1998, clause 4.2.6  
IEC950:1991, 2nd Edition  
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